ATTACHMENT 7. ECONOMIC ANALYSIS – FLOOD DAMAGE REDUCTION COSTS AND BENEFITS

Each applicant must provide the following information:

Narrative description of the project and its relationship to other projects in the Proposal.

The Cactus Basin No. 3, 4, and 5 Project functions hand in hand with several of the other projects proposed for Proposition 84 funding. While it's direct beneficiaries mostly reside in the City of Rialto, the project is part of a much larger system of facilities that impacts the Santa Ana River Watershed. While the project's primary function will be to provide the flood protection, it will also alleviate some of the demands for additional water supply as it will have recharge capacity into the basin which will benefit downstream customers. Also, because of the off-site mitigation requirements, the project will provide environmental enhancement by preserving 45 acres of undisturbed land within the Santa Ana River basin in perpetuity.

Narrative description of the project's economic costs.

Including contingencies and soft costs, the project is expect to cost approximately $35,346,985 to construct. The construction will consist of improvements to Basins 3, 4, and 5. Surface water in the area will flow southward from the existing Cactus Channel into Basin #5, then from Basin #5 into Basin #4, and from Basin #4 into Basin #3. Surface water will then flow from Basin #3 through an existing reinforced concrete box and pipe structure (located in the southwest corner of Basin #3) under Baseline Road into the existing Rialto Channel and Basins 2 and 1. The outlet of existing Basin #1 connects to Rialto Channel, which flows approximately 5.4 miles southward to the Santa Ana River.

Cost details for the project using Table 10 and the information in Table 7 (Budget).

[See Table 10]

Narrative description of all of the project's Expected Annual Damage (EAD) for both with and without improvements.

The FRAM Model was used to determine that the Event Benefit (See Table 11- Event Damage) for the 100-year storm is $15, 278, 599.

Estimates of historical flood damage data,

Flooding along the Rialto Channel (located immediately downstream of Cactus Basin Channels) occurs on a fairly regular basis, even during fairly moderate rain events. During these moderate events, the City of Rialto regularly has to expend resources to both manage the flooding as it is happening to ensure the public is safe, and in cleaning up after the event. In the winter of 2004/2005, flooding along the channel was so severe that it damage several property walls of residences immediately adjacent to the channel. The cost to replace the block walls was approximately $1.2 million , which was shared by both the District and the City of Rialto.

Estimates of existing without-project conditions,

Currently, Cactus Basins 3 through 5 are all in an interim state. This project will improve Cactus Basin Nos. 3, 4, and 5 which will attenuate flow into Rialto Channel. Attached are estimates of damage that may be incurred for three different storm events, 10, 50, and 100 year storms in the current interim state.

Estimates of existing with-project conditions,

Also attached are estimates that show what the expected damage may be in the case that the project is constructed for the same storm frequency events.

Description of methods used to estimate without- and with-project conditions,

The without and with project conditions were estimated using WSPG software to estimate the flood plain during the 10, 50, and 100 year storm events. Once the flood plain was established, GIS software was used to pull property value information from the County Assesor's database and FRAM was used to estimate the cost of damage to the affected parcels. The without and with damage cost estimates were then compared for each storm event to determine the flood protection benefit that would be realized with the project.
Description of the distribution of local, regional, and statewide benefits, as applicable,
All flood protection benefits will be realized on a local level. According the estimates performed, the 100 year event without the project would affect an area of approximately 198 acres, all of it immediately adjacent to the Rialto Channel.

Identification of beneficiaries,
Beneficiaries include the residences and businesses in the City of Rialto who live adjacent to the Rialto Channel, as well as all other citizens who may be in the immediate vicinity during a storm event. Both the City of Rialto and the District will also benefit in that the existing flood control facilities will have improved functionality and will require less resources to maintain the system downstream of the basin.
When the benefits will be received,
The flood protection benefit will be received during the first storm after the completion of the construction. The basin's capacity will have been increased, thus attenuating storm flows that would have otherwise made their way into the Rialto Channel and potentially causing flooding.
Uncertainty of the benefits, and
None
Description of any adverse effects.
None
Narrative discussion that describes, qualifies, and supports the values entered in the tables.
The various without and with project flood footprints were determined using industry standard engineering practices and software. The property values were taken for the County Assesor's parcel information database.
If possible, quantify estimates of economic flood damage reduction benefits using Table 12 as applicable.
[See Table 12]
Documentation to support information presented in the project(s), including studies, reports, and technical data, which will be used to assess the project's ability to produce the benefits claimed.
The flow rates used for the analysis were provided by the District's Water Resources Division, who are the custodians of the County's hydrologic data. The Supplemental Environmental Impact Report, 2007, was also used to obtain information regarding this project.
Describe Qualitatively: Other Flood Damage Reduction Benefits
Even during moderate storms the roadways adjacent to the Rialto Channel experience flooding, so much so that it becomes a public hazard for both pedestrian and vehicular traffic. Generally speaking, the public has a misunderstanding as to how powerful flood waters can be. In severe cases, flooding could easily sweep a vehicle off the ground and send it downstream, potentially injuring passengers and/or causing damage to whatever it may impact or hit. By constructing the proposed improvements to Cactus Basins No. 3, 4, and 5 the District will reduce the likelihood that the above scenario will actually play out. The ultimate mission of the District is ensure safe and desirable communities for the people of San Bernardino County.

Table 10- Annual Cost of Flood Damage Reduction Project

(All costs should be in 2009 Dollars)
Project: Cactus Basins 3 through 5

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 6 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009							$0	1.000	$0
2010							$0	0.943	$0
2011	$9,196,887						$9,196,887	0.890	$8,185,229
2012	$26,150,098	$1,500	$3,000	$7,000			$26,161,598	0.840	$21,975,742
2013		$ 4,500	$ 9,000	$ 21,000			$34,500	0.792	$27,324
2014		$ 4,500	$ 9,000	$ 21,000			$34,500	0.747	$25,772
2015		$ 4,500	$ 9,000	$ 21,000			$34,500	0.705	$24,323
2016		$ 4,500	$ 9,000	$ 21,000			$34,500	0.665	$22,943
2017		$ 4,500	$ 9,000	$ 21,000			$34,500	0.627	$21,632
2018		$ 4,500	$ 9,000	$ 21,000			$34,500	0.592	$20,424
2019		$ 4,500	$ 9,000	$ 21,000			$34,500	0.558	$19,251
2020		$ 4,500	$ 9,000	$ 21,000			$34,500	0.527	$18,182
2021		$ 4,500	$ 9,000	$ 21,000			$34,500	0.497	$17,147
2022		$ 4,500	$ 9,000	$ 21,000			$34,500	0.469	$16,181
2023		$ 4,500	$ 9,000	$ 21,000			$34,500	0.442	$15,249
2024		$ 4,500	$ 9,000	$ 21,000			$34,500	0.417	$14,387
2025		$ 4,500	$ 9,000	$ 21,000			$34,500	0.394	$13,593
2026		$ 4,500	$ 9,000	$ 21,000			$34,500	0.371	$12,800
2027		$ 4,500	$ 9,000	$ 21,000			$34,500	0.35	$12,075
2028		$ 4,500	$ 9,000	$ 21,000			$34,500	0.331	$11,420
2029		$ 4,500	$ 9,000	$ 21,000			$34,500	0.312	$10,764
2030		$ 4,500	$ 9,000	$ 21,000			$34,500	0.294	$10,143
2031		$ 4,500	$ 9,000	$ 21,000			$34,500	0.278	$9,591
2032		$ 4,500	$ 9,000	$ 21,000			$34,500	0.262	$9,039
2033		$ 4,500	$ 9,000	$ 21,000			$34,500	0.247	$8,522
2034		$ 4,500	$ 9,000	$ 21,000			$34,500	0.233	$8,039
2035		$ 4,500	$ 9,000	$ 21,000			$34,500	0.22	$7,590
2036		$ 4,500	$ 9,000	$ 21,000			$34,500	0.207	$7,142
2037		$ 4,500	$ 9,000	$ 21,000			$34,500	0.196	$6,762
2038		$ 4,500	$ 9,000	$ 21,000			$34,500	0.185	$6,383
2039		$ 4,500	$ 9,000	$ 21,000			$34,500	0.174	$6,003
2040		$ 4,500	$ 9,000	$ 21,000			$34,500	0.164	$5,658
2041		$ 4,500	$ 9,000	$ 21,000			$34,500	0.155	$5,348
2042		$ 4,500	$ 9,000	$ 21,000			$34,500	0.146	$5,037
2043		$ 4,500	$ 9,000	$ 21,000			$34,500	0.138	$4,761
2044		$ 4,500	$ 9,000	$ 21,000			$34,500	0.13	$4,485
2045		$ 4,500	$ 9,000	$ 21,000			$34,500	0.123	$4,244
2046		$ 4,500	$ 9,000	$ 21,000			$34,500	0.116	$4,002
2047		$ 4,500	$ 9,000	$ 21,000			$34,500	0.109	$3,761
2048		$ 4,500	$ 9,000	$ 21,000			$34,500	0.103	$3,554
2049		$ 4,500	$ 9,000	$ 21,000			$34,500	0.097	$3,347
2050		$ 4,500	$ 9,000	$ 21,000			$34,500	0.092	$3,174
2051		$ 4,500	$ 9,000	$ 21,000			$34,500	0.087	$3,002
2052		$ 4,500	$ 9,000	$ 21,000			$34,500	0.082	$2,829
2053		$ 4,500	$ 9,000	$ 21,000			$34,500	0.077	$2,657
2054		$ 4,500	$ 9,000	$ 21,000			$34,500	0.073	$2,519
2055		$ 4,500	$ 9,000	$ 21,000			$34,500	0.069	$2,381
2056		$ 4,500	$ 9,000	$ 21,000			$34,500	0.065	$2,243
2057		$ 4,500	$ 9,000	$ 21,000			$34,500	0.061	$2,105
2058		$ 4,500	$ 9,000	$ 21,000			$34,500	0.058	$2,001
2059		$ 4,500	$ 9,000	$ 21,000			$34,500	0.055	$1,898
Project Life	$ 35,346,985	$ 213,000	$ 426,000	$ 994,000			##########	…	
							Total Present Value of Discounted Costs (Sum of Column (i))		$30,612,646
							Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries		

Comments:

(1) The incremental change in O&M costs attributable to the project.

Table 11 - Event Damage							
Hydrologic Event	Event Probability	Damage if Flood Structures Fail	Probability Structural Failure		Event Damage		Event Benefit (Million $)
			Without Project	With Project	Without Project	With Project	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
					(c) x (d)	(c) x (e)	(f) – (g)
10-Year	0.1	$6,216,278	0.5	0	$3,108,139	$0	$3,108,139
50-Year	0.02	$27,319,808	1	0.1	$27,319,808	$2,731,981	$24,587,827
100-Year	0.01	$30,557,197	1	0.5	$30,557,197	$15,278,599	$15,278,599

Figure 1 - Loss Probability Curves (Example)

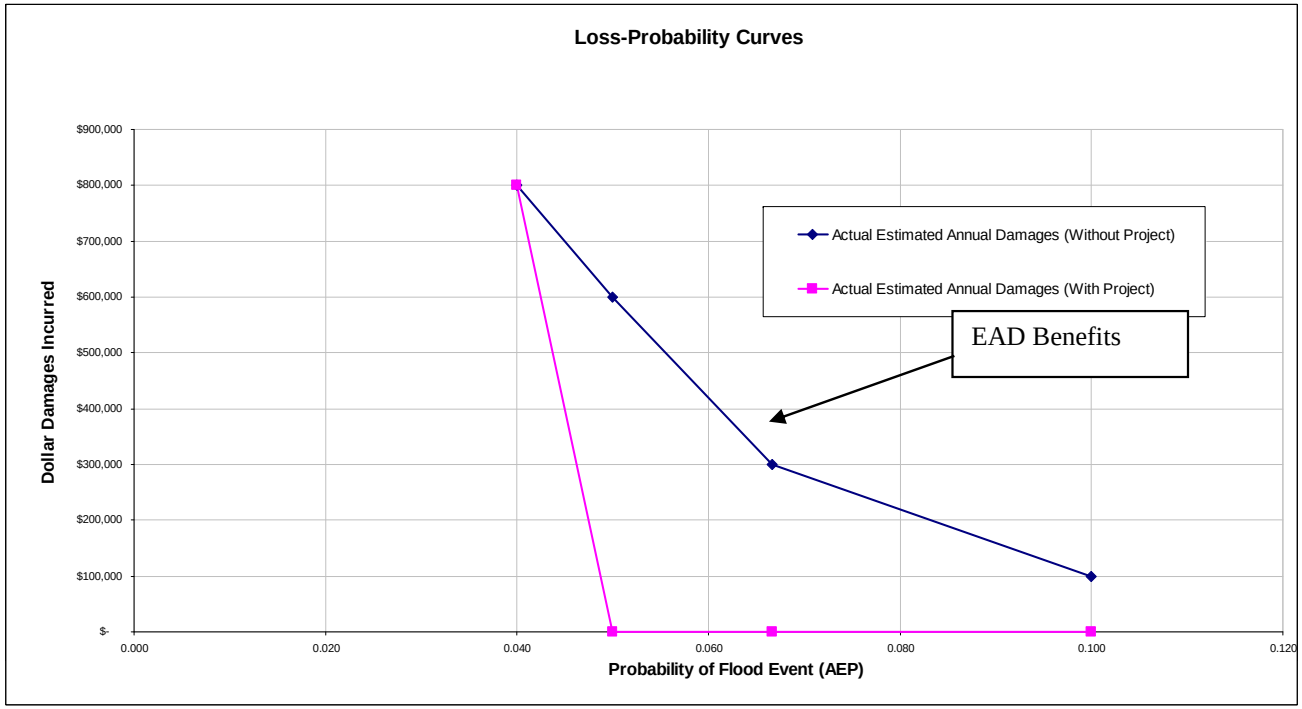

Table 12 - Present Value of Expected Annual Damage Benefits			
Project:	Cactus Basins 3 through 5		
(a)	Expected Annual Damage Without Project (1)		**$3,173,991**
(b)	Expected Annual Damage With Project (1)		**$30,826**
(c)	Expected Annual Damage Benefit	(a) – (b)	**$3,143,165**
(d)	Present Value Coefficient (2)		**15.76**
(e)	**Present Value of Future Benefits** **Transfer to column (e) Table 20: Proposal Costs and Benefits Summaries.**	**(c) x (d)**	**$49,536,280**

(1) This program assumes no population growth thus EAD will be constant over analysis period.

(2) 6% discount rate; 50-year analysis period (could vary depending upon life cycle of project).